Subduction Boundary

- Introduction
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  - The inner strata of the Earth.
- Theory
  - Plate tectonic
  - How plates move
  - Plates boundaries
  - (Subduction Zones)
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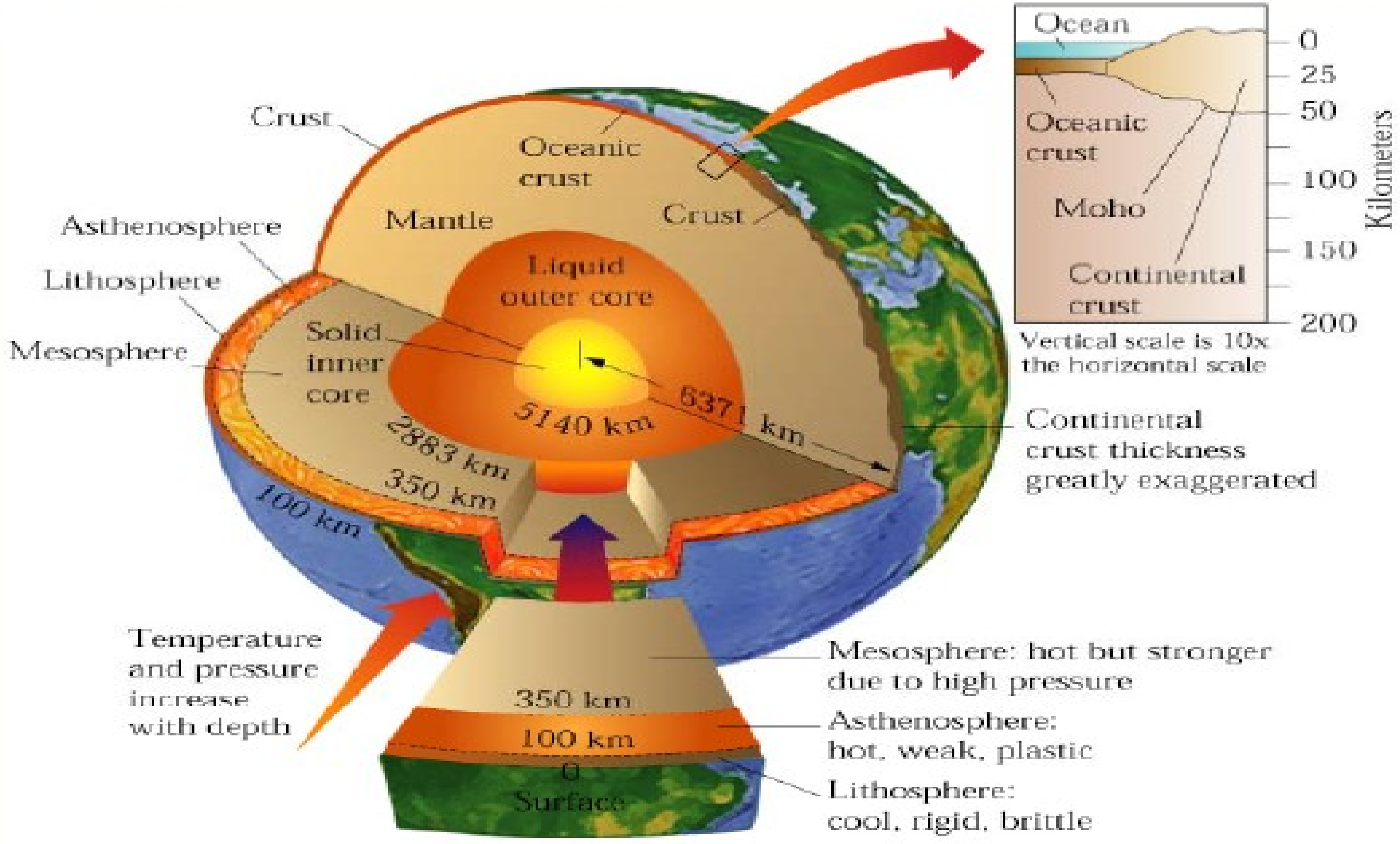
Introduction

General Information About the Earth

- Four billion six hundred million years ago the Earth is born from a cloud of dust and fire orbiting the sun.
- In the beginning there are no seas upon the barren Earth.
- Earth is incredibly hot with a sea of molten rock covering its surface. The early Earth is a world in slow turmoil for many, many thousands of years.

The inner strata of the Earth


Crust
Oceanic crust
Mantle
Crust
Asthenosphere
Lithosphere
Mesosphere
Liquid outer core
Solid inner core
5140 km
6371 km
2883 km
350 km
100 km
Ocean
Oceanic crust
Moho
Continental crust
0
25
50
100
150
200
Kilometers
Vertical scale is 10x the horizontal scale
Continental crust thickness greatly exaggerated
Temperature and pressure increase with depth
350 km
100 km
0
Surface
Mesosphere: hot but stronger due to high pressure
Asthenosphere: hot, weak, plastic
Lithosphere: cool, rigid, brittle

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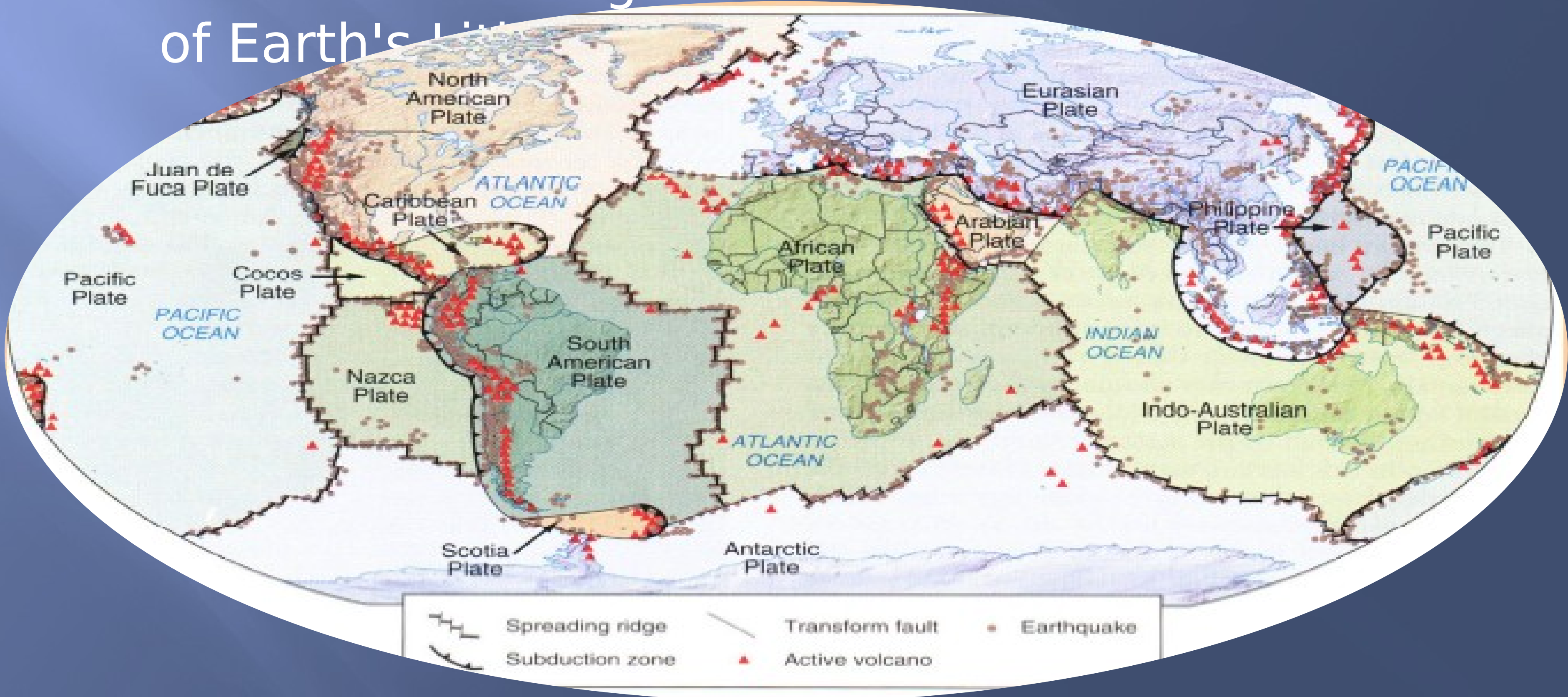
Theory

Plate Tectonic

- The branch of geology studying the folding and faulting of the Earth's crust and a scientific theory describes the large scale motions of Earth's



How Plates Move

A) Driving Forces

- - Slab Pull
- - Push Ridge
- - Basal Drag

B) Three mantel convention Possibility

- **- O**n Asthenosphere
- - Whole mantel
- - From Mantel Plume

Plates boundaries :

- **Divergent boundary**
- **Convergent boundary (Subduction Boundary)**
- **Transform boundary**

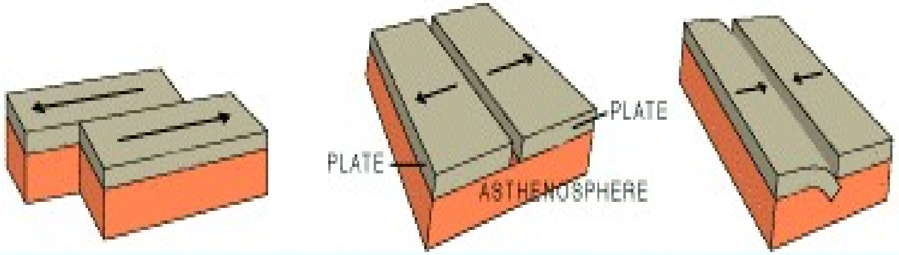
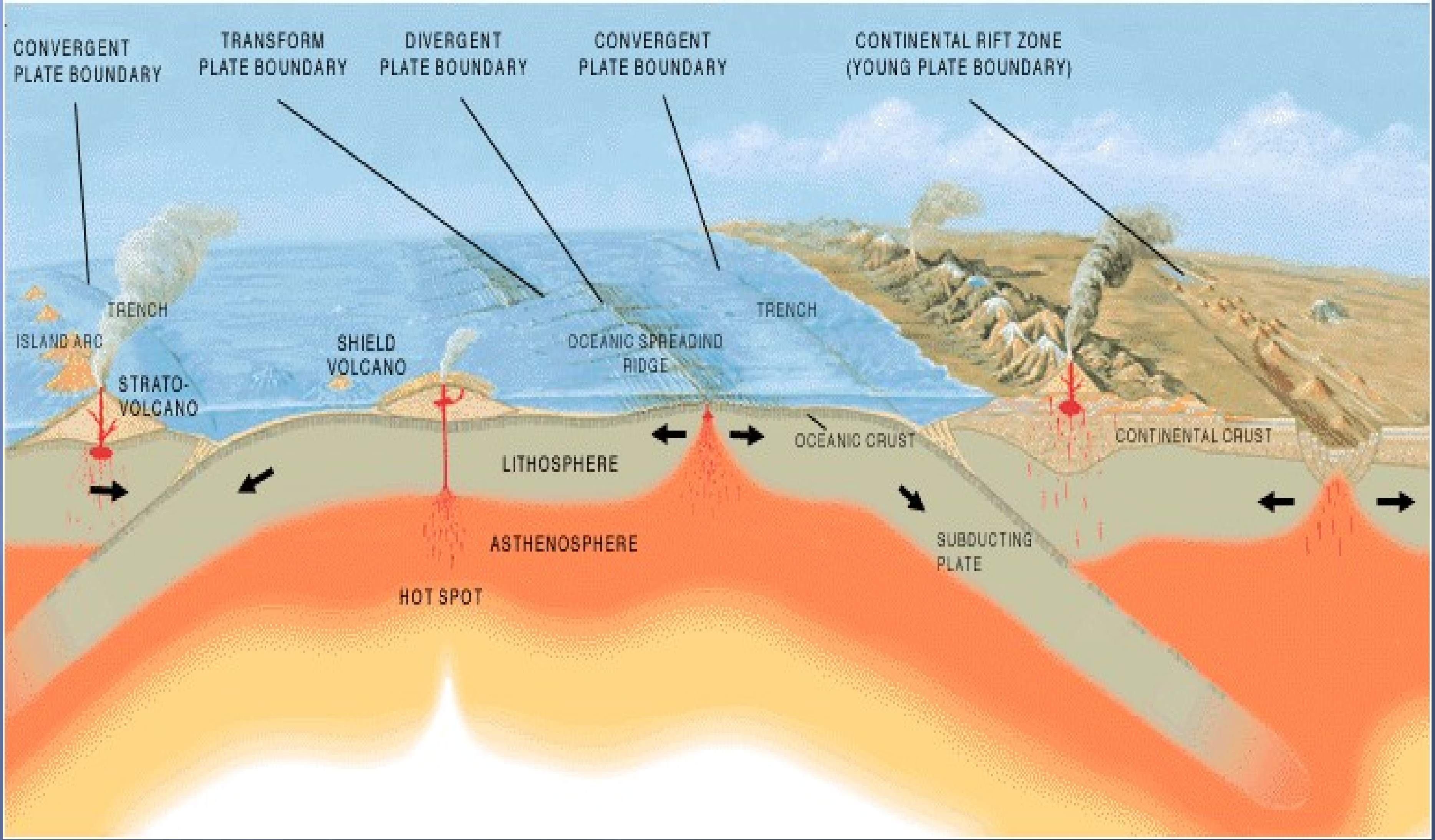
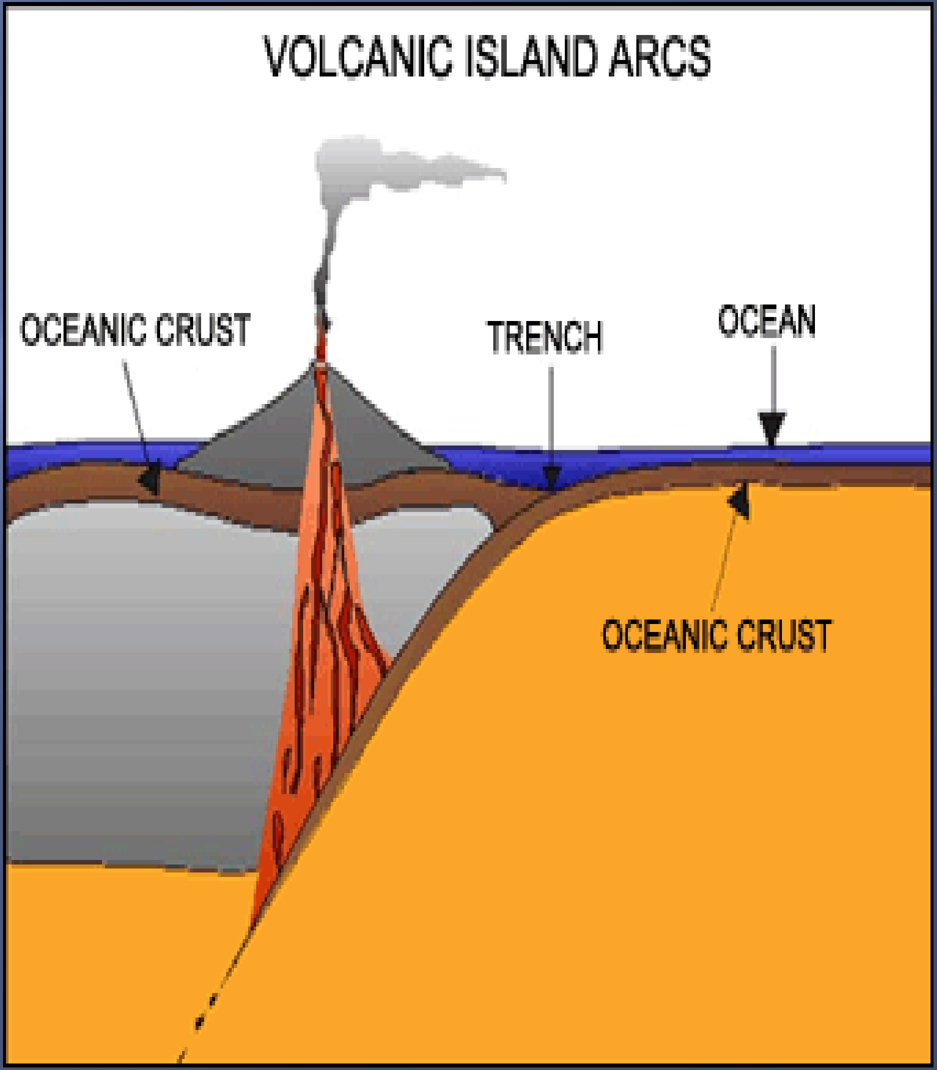


PLATE
PLATE
ASTHENOSPHERE


CONVERGENT PLATE BOUNDARY
TRANSFORM PLATE BOUNDARY
DIVERGENT PLATE BOUNDARY
CONVERGENT PLATE BOUNDARY
CONTINENTAL RIFT ZONE (YOUNG PLATE BOUNDARY)
TRENCH
ISLAND ARC
STRATO-VOLCANO
SHIELD VOLCANO
OCEANIC SPREADIND RIDGE
TRENCH
OCEANIC CRUST
CONTINENTAL CRUST
LITHOSPHERE
ASTHENOSPHERE
HOT SPOT
SUBDUCTING PLATE

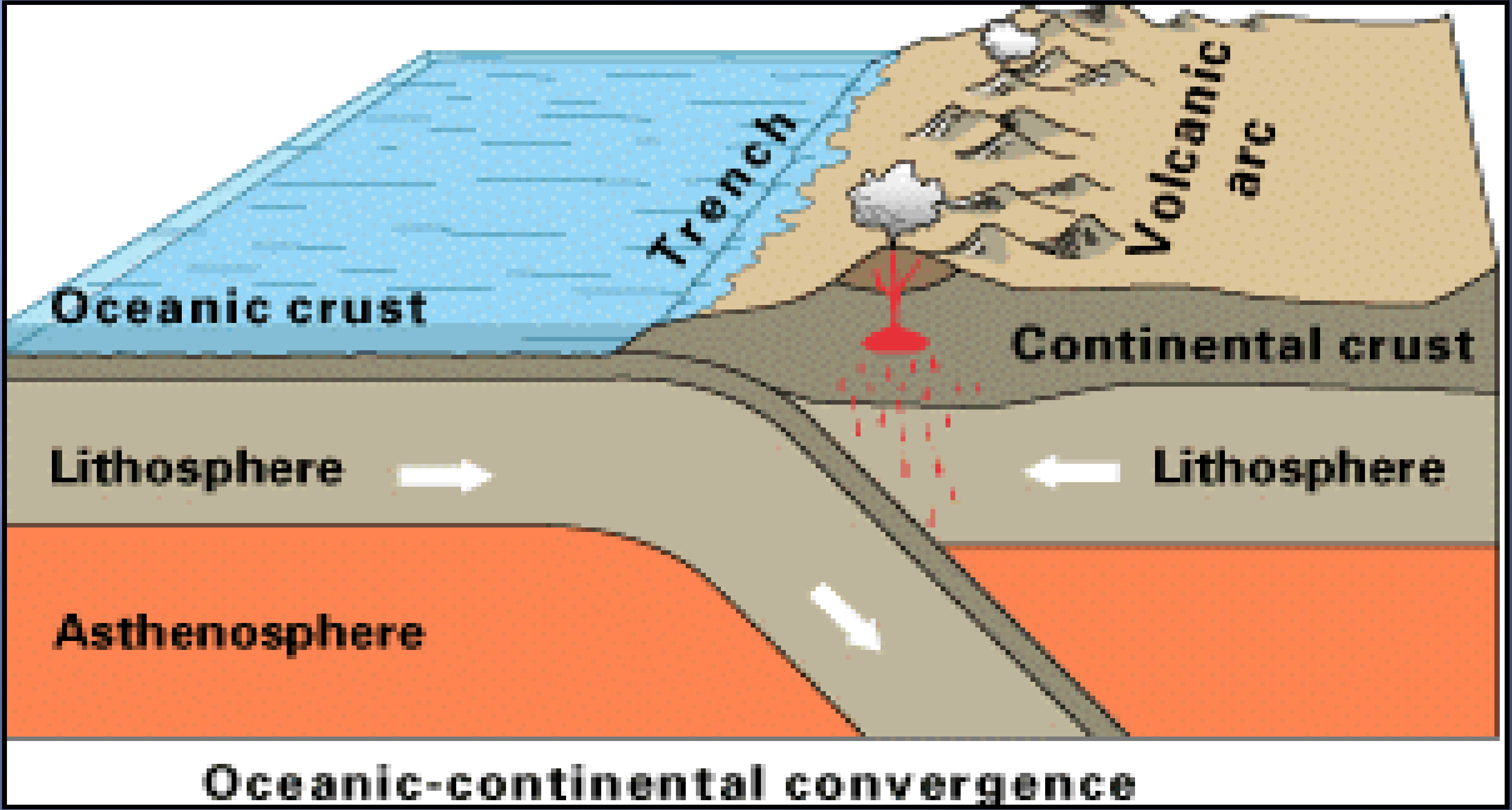
Subduction boundary

- Occur where two plates slide towards each other commonly forming either a subduction zone (if one plate moves underneath the other) or a continental collision (if the two plates contain continental crust).



Types of subduction zone :

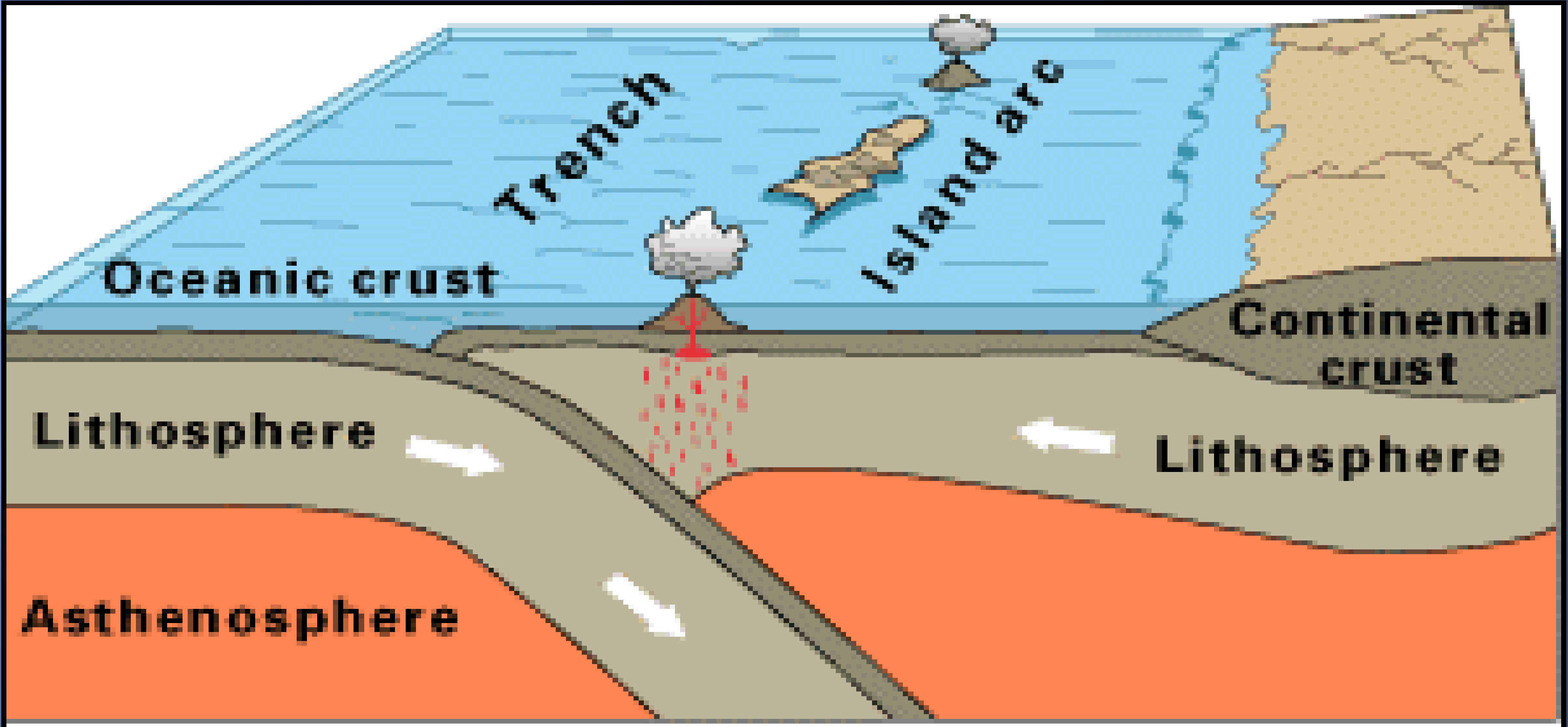
- *Oceanic-Continental Convergence*



Oceanic-continental convergence

Types of subduction zone :

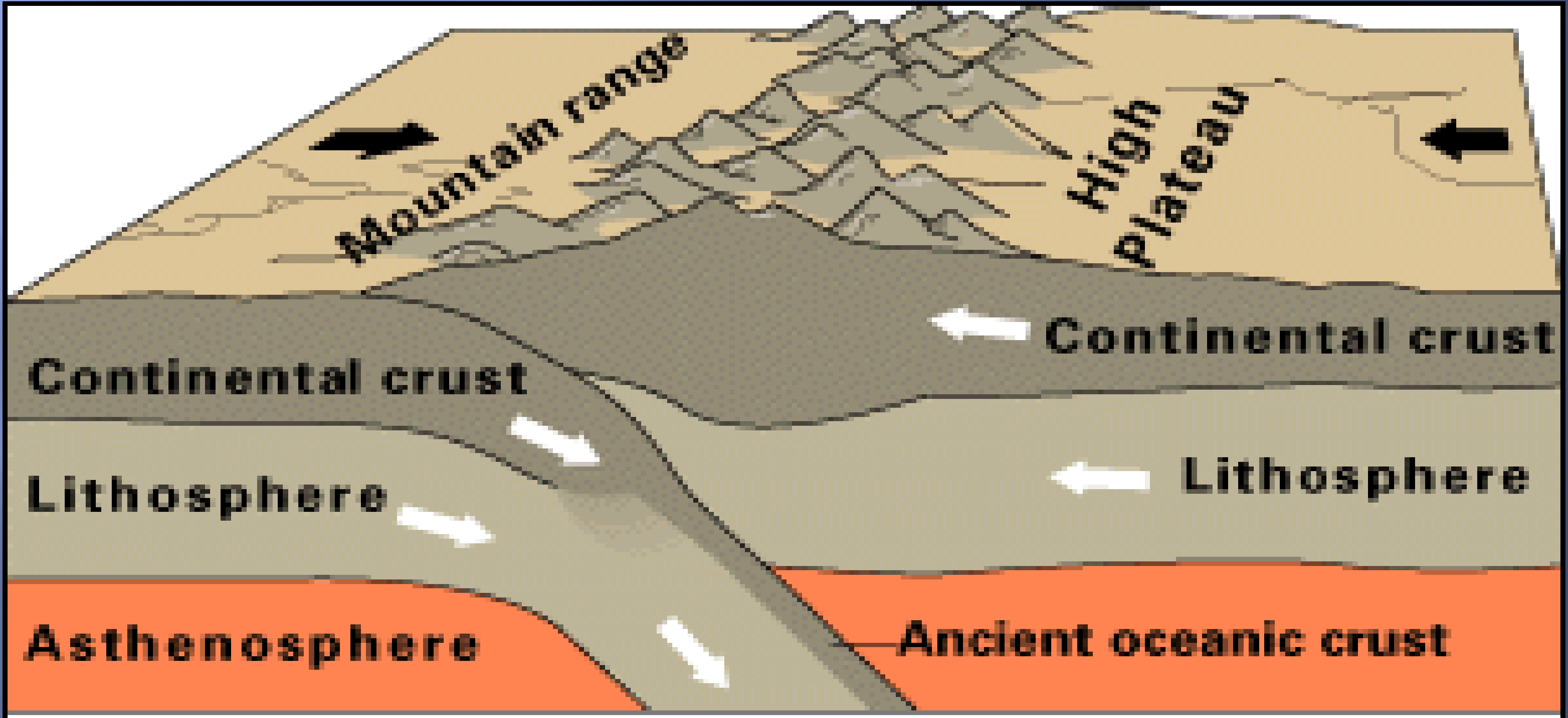
OCEANIC-OCEANIC CONVERGENCE



Oceanic-oceanic convergence

Types of subduction zone :

CONTINENTAL-CONTINENTAL CONVERGENCE



Continental-continental convergence

YouTube - Elastic Rebound in a Subduction Zone.flv

Case study

Tsunami & Earthquakes

- The stresses caused by plate convergence in subduction zones cause dangerous earthquakes.

- A consequence of earthquake is Tsunami which is defined by raising waves above the normal limits.

YouTube - Animation of Earthquake and Tsunami in Sumatra.flv

YouTube - Tsunami Generation Animation Generated by a Subduction Zone Earthquake.flv

Conclusion

- **Subduction** is a geological process in which one edge of a crustal plate is forced sideways and downward into the mantle below another plate.
- **A Subduction Zone** is a convergent boundary where two tectonic plates collide.
- Subduction zones create geologic formations such as mountain ranges, ocean trenches , and island arcs, as well as phenomena like earthquakes and volcanoes.

- Geologists have learned about how subduction zones work by studying earthquakes in seismology and volcanoes in volcanology.

- Green soapstone is formed from large deposits of talc that occur in subduction zones, where tectonic plates rub against each other.

- The gradual movement of the plates causes the stone to undergo a chemical change called dynamothermal metamorphism, which re-crystallizes the chemical components of the stone, resulting in a combination of talc, chlorite, dolomite, and magnesite .

- Convergent boundary or subduction zone are the same

Q & A

THE END

- THANK YOU
- TERIMA KASIH
- GRACIAS
- MERCI POUCOUN
- SHUKRAN